DOCUMENT RESUME

ED 444 518 IR 020 174

AUTHOR Victor, Stephen P.; Vafa, Shahrzad

TITLE Design and Development of Interactive Multimedia for Library Research Instruction.

PUB DATE 2000-00-00

NOTE 7p.; In: Society for Information Technology & Teacher Education International Conference: Proceedings of SITE 2000 (11th, San Diego, California, February 8-12, 2000). Volumes 1-3; see IR 020 112.

PUB TYPE Reports - Descriptive (141) -- Speeches/Meeting Papers (150)

EDRS PRICE MF01/PC01 Plus Postage.

DESCRIPTORS Academic Libraries; Authoring Aids (Programming); *Computer Assisted Instruction; *Courseware; Higher Education; Instructional Design; Instructional Development; *Library Instruction; Library Skills; *Material Development; *Multimedia Instruction; *Multimedia Materials; Research Skills; World Wide Web

IDENTIFIERS Authorware

ABSTRACT

This paper describes the design and development of a multimedia program that provides instruction in locating, evaluating and citing information in a university library. The use of interactive multimedia for instruction is also discussed. The program was developed by a collaborative team of instructional designers, content experts, and media consultants using Authorware. The program uses multimedia elements, interactivity, Web-based media, and games to enhance the learner's experience of the instruction. Preliminary evaluations indicate the program is an effective means of providing undergraduate library research instruction. Contains 20 references. (Author/MES)

Reproductions supplied by EDRS are the best that can be made
from the original document.

ED 444 518

Design and Development of Interactive Multimedia for Library Research Instruction

U.S. DEPARTMENT OF EDUCATION
Office of Educational Research and Improvement
EDUCATIONAL RESOURCES INFORMATION CENTER (ERIC)
☐ This document has been reproduced as received from the person or organization originating it.
☐ Minor changes have been made to improve reproduction quality.
• Points of view or opinions stated in this document do not necessarily represent official OERI position or policy.

PERMISSION TO REPRODUCE AND DISSEMINATE THIS MATERIAL HAS BEEN GRANTED BY

G.H. Marks

TO THE EDUCATIONAL RESOURCES INFORMATION CENTER (ERIC)

Stephen P. Victor
Shahrzad Vafa
Department of Curriculum and Instruction
College of Education
University of Houston
Houston, Texas, USA
Email: svictor@bayou.uh.edu; sghorban@bayou.uh.edu

Abstract: This paper describes the design and development of a multimedia program that provides instruction in locating, evaluating and citing information in a university library. The paper also discusses the use of interactive multimedia for instruction. The program was developed by a collaborative team of instructional designers, content experts, and media consultants using Authorware. The program uses multimedia elements, interactivity, Web-based media, and games to enhance the learner's experience of the instruction. Preliminary evaluations indicate the program is an effective means of providing undergraduate library research instruction.

Introduction

Instructors of university freshmen and sophomores often find that their students lack basic library skills. Because the ability to acquire and evaluate information is vital to success in our information society, it is crucial that students learn the tools and skills required to effectively access and use information resources. Colleges and university libraries have adopted many strategies for teaching library research skills, including instructional handouts, library tours, classes, and online instruction. Hallis (1996) notes that electronic library resources provide access to library expertise at the user's convenience and that elementary and secondary students are gaining facility with electronic resources and an increasing expectation that such resources will be available at the university. This paper describes the design and development of a multimedia project that provides instruction in locating information in a university library, evaluating the information for relevance and value, and citing the information using accepted citation formats.

Interactive Multimedia and Instruction

The term *multimedia* has a number of connotations. Essentially, multimedia is the integration of some or all of the following components: text, audio sound, static graphic images, animations, and full-motion video (Perry, 1994). *Interactive* multimedia empowers the user to control the software environment (Phillips, 1997).

The team chose to create a multimedia tutorial for this project because of the advantages that integration of multimedia would bring to the instruction. While some researchers believe that media is merely a vehicle to deliver instruction, and that media itself does not affect student achievement (Clark, 1994; Soloway, 1994), recent research does indicate advantages to the integration of multimedia in education. Yaverbaum and Nadarajan (1995) gathered several studies pertaining to multimedia and learning. One of the studies they review describes the following benefits of multimedia (Shim, 1992, as cited in Yaverbaum & Nadarajan, 1995):

- Increased learning and a reduction of learning transfer time
- The presentation of nonlinear access to information
- The ability to link information
- The promotion of a collaborative work environment
- The ability to present information in multiple media

IR020174

BEST COPY AVAILABLE

Another important advantage is the control that learners have in multimedia instruction. Barker (1990) notes that in multimedia instruction learners select what they learn, and they control the pace, direction, and style of the learning experience. In addition, visualization of instructional materials through the incorporation of graphics, audio, and video help students better comprehend the instruction (Kozma, 1991). Kozma also states that multimedia instruction allows learners to quickly retrieve previously learned information, facilitating review of instruction.

Numerous studies have compared multimedia instruction to more conventional methods of instruction. Most of these studies indicate that multimedia instruction is more effective. For example, Oz and White (1993) conducted a meta-analysis of 47 studies comparing multimedia instruction with conventional instruction in the military, industry, and higher education. Analysis of "knowledge," "performance," and "retention of trainees" variables revealed that multimedia was more effective and less costly than conventional instruction.

In a study of middle school students, Small and Ferreira (1994) found that when given an information-gathering task, students using a multimedia resource spent more time exploring the information and performed better research than students using printed resources. Interestingly, the authors suggest that middle school students perceive information delivered through video and sound as more credible than information delivered in printed form, and so they have a greater trust of multimedia information and are more engaged when conducting research with multimedia.

Developing Multimedia Using Authorware

The team used Authorware Professional by Macromedia as its development tool. Authorware provides a feature-rich environment for the development of interactive multimedia instruction. Authorware presentations can be distributed via a network, on CD-ROM, or a combination of the two. It supports a wide variety of file formats and media elements, including graphics, sound, and digital video files. Our project makes full use of the interactive capabilities of Authorware and includes sound and animation, quizzes with popup feedback, the ability to access library resources on the World Wide Web, and games intended to provide practice and feedback on comprehension. Indeed, Authorware is particularly noted for its ability to provide multiple choice quizzes and similar learning interactions (Phillips, 1997). User control is enhanced by Authorware's ability to accept many kinds of input, including keypresses, mouse clicks, text responses, conditional responses, and limits on response times (Jenkins & Cartledge, 1995). Authorware can also be used to test for correct or incorrect user responses and to provide learner feedback (Niemeyer, 1997). Authorware uses a flow line interface in which various interaction icons can be dragged and dropped, reordered, copied, and deleted as required (Jenkins & Cartledge, 1995). Authorware has been used to develop multimedia instruction for a number of diverse content areas, including biotechnology (Jenkins & Cartledge, 1995), forestry (Seiler, Peterson, Taylor, & Feret, 1997), library skills (Niemeyer, 1997), and airline flight staff training (Snydar, 1998).

About the Project

The project, "Library Research: Learning the Basics," was designed by a team of graduate students in an instructional technology course. The two-semester sequence, entitled "Collaborative Design of Multimedia" and "Collaborative Development of Multimedia," was intended to teach the skills needed for developing educational multimedia using collaborative teams (McNeil & Varagoor, 1999). Using the Seels and Glasgow (1997) model of instructional design, the team worked with a professor of history to identify instructional needs, formulate objectives, write content, and create storyboards for the project. The initial target population for the project was freshman and sophomore students in an American history survey course taught at the University of Houston. During the second semester, three of the original team members used Authorware to develop the project. The team worked with artists to design the interface and graphical elements of the piece, and with technical experts to record spoken word portions of the instruction.

The design team team identified four primary objectives for the instruction:

- identify and refine a research topic
- find information related to the research topic
- evaluate the information using the evaluation criteria presented in the piece

- cite the information using appropriate styles (MLA, APA, etc.)

Each of these primary objectives was further divided into smaller objectives. Several lessons and interactions were created to address each objective. The program's opening menu provides access to each topic area and to further information about the project (Figure 1).

Figure 1: Opening menu.

Program Interface

Our goal in designing the program's interface was an uncluttered appearance and ease of use. Because the program was intended for use by undergraduate students of United States history students, our graphic design consultants used embossed buttons and historical images to create a "feel" of American history in the program.

The **Menu** button provides instant access to the main menu at any time. The **Find** button displays a popup window that allows the learner to enter a desired search term; the window then displays a listing of screens in which the term appears from which the learner can select. The **Map** button displays a listing of all of the program's learning objectives and sub-objectives. The **Exit** button allows the learner to close the program (this option is also available from the **File** menu in the upper left corner of the window). The left and right arrow buttons allow linear navigation backward and forward through the instruction. The **Help** menu in the upper left corner of the window displays descriptions of navigational elements and other icons in the program.

Using Multimedia to Enhance Learning

Small and Ferreira (1994) write that the goal of the library media specialist is to develop information problem solving skills that apply both to printed resources and to newer information technologies. Our goal in developing a multimedia project for library instruction was to teach library research skills in a stimulating way. We did not want learners to passively receive instruction but rather to become engaged by it. To accomplish this, we took advantage of multimedia elements such as sound, motion, and feedback to capture the learner's interest and enhance learning (Lee & Boling, 1999). For example, upon opening the program, the learner is asked to type his or her name. This entry is stored as a variable so that the program can displayed the learner's name in selected interactions throughout the instruction, thus personalizing the experience for the learner.

Sound and Visual Elements

Dual coding theory suggests that a combination of multimedia elements, such as sound and visual cues, can enhance learning (Mayer & Sims, 1994). Several screens in the project present the learner with the opportunity to hear spoken commentary and to read a transcript of the commentary if desired. By clicking on the bell icon, the

4 BEST COPY AVAILABLE

learner can hear recorded narration on information literacy. Clicking on the scroll icon causes a transcript of the narration to appear (Figure 2).

Interactivity

Various icons in the program provide access to tips and examples of topics covered in the instruction. As shown in the following figure, by clicking on the key icon, the learner can learn expanded information on the instructional text. In many screens, interested learners can find more information on a topic by clicking on star-shaped icons for examples and directions to sources of further information. In other interactions, the learner can position the mouse pointer over an item to display explanatory text (Figure 3).

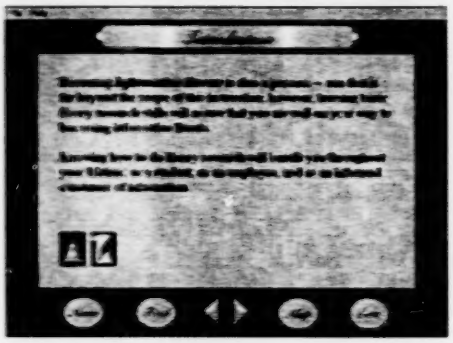

Figure 2: Sound and transcript.

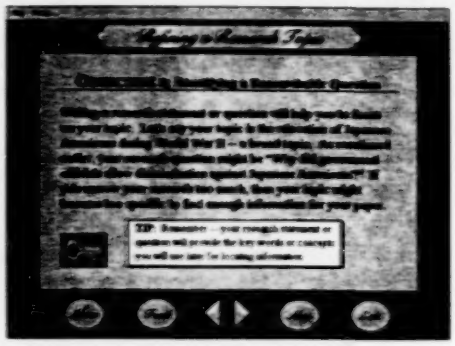

Figure 3: Using the key icon to get a tip.

Feedback

Meaningful feedback on student performance is an important component of all instruction, including interactive multimedia (Laurillard, 1993). While it is difficult to simulate the personal interaction between teacher and learner in a software program, our program provides quizzes and other practice activities containing feedback tailored for each question and response. Incorrect feedback provides assistance with identifying correct response, while correct feedback provides positive reinforcement, as shown in Figure 4.

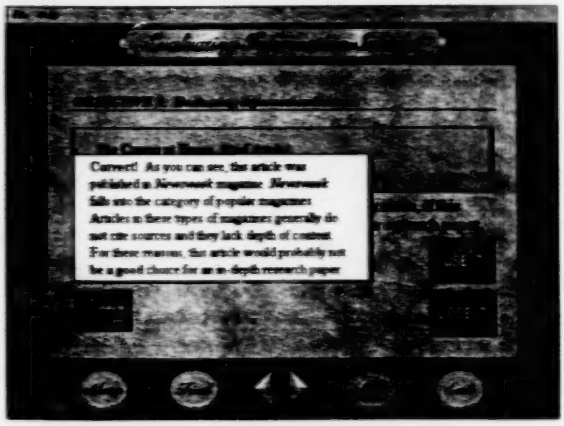
Correct! As you can see, the article was
published in Newsweek magazine. Newsweek
falls into the category of popular magazines.
Articles in these types of magazines generally do
not cite sources and they lack depth of content.
For these reasons, this article would probably not
be a good choice for an in-depth research paper.

Figure 4: Feedback for correct response.

BEST COPY AVAILABLE

Games and Simulations

Games and simulations of real-world activities can provide learner motivation and reinforce concepts learned in instructional multimedia (Rieber, 1996). We incorporated three such interactions into our program: a drag and drop exercise to reinforce information evaluation criteria, a book shelving game to practice the Library of Congress classification system, and an adaptation of Rieber's (1997) board game design to provide practice of all the concepts learned in the instruction.

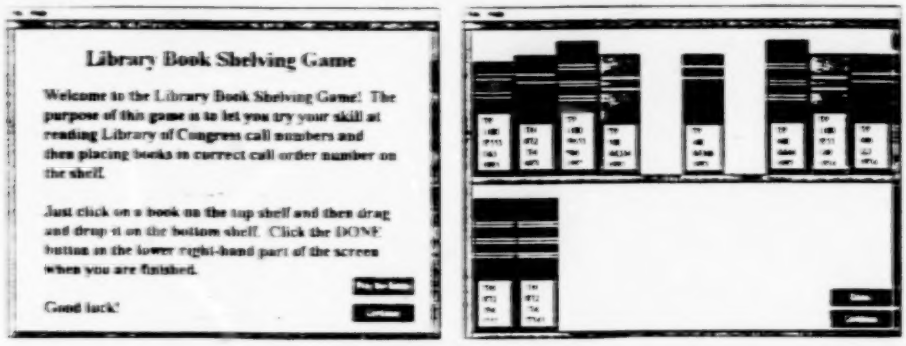
Library Book Shelving Game
Welcome to the Library Book Shelving Game! The purpose of this game is to let you try your skill at reading Library of Congress call numbers and then placing books in correct call order number on the shelf.
Just click on a book on the top shelf and then drag and drop it on the bottom shelf. Click the DONE button in the lower right-hand part of the screen when you are finished.
Good luck!

Figure 5: Library book shelving game.

Web-Based Media

The Windows version of Authorware allows the inclusion of URLs (unfortunately, this feature uses an ActiveX control, which is not available on Macintosh platforms). We used this feature to allow learners to access and use the university's online catalog within the program. Exercises ask learners to answer questions about the library's holdings and to evaluate Web-based sources of information.

Discussion

This paper has described the collaborative design and development of an interactive multimedia project to teach library research skills. Instructional designers, content experts, graphic artists, and technical specialists worked together to create an engaging instructional product. Initial formative evaluations, including evaluations by the dean of libraries and other librarians at the university, suggest that the piece is an effective tool for providing self-paced instruction in basic library research skills. While instructional examples focus on using the library for historical research, we believe the program could readily be used to provide library instruction for undergraduate students at any level and in any course.

References

Clark, R. E. (1994). Media will never influence learning. *Educational Technology Research and Development, 42*(2), 7-19.

Hallis, R. H. (1996). Authoring multimedia in an academic library. Omaha, NE: University of Nebraska. (ERIC Document Reproduction Service No. ED 400 822)

Jenkins, R. O., & Cartledge, T. G. (1995). Elucidation and manipulation of metabolic pathways: Courseware developed using Authorware Professional. *Biochemical Education, 23*(3), 155-157.

Kozma, R. B. (1991). Learning with media. *Review of Educational Research, 61*(2), 179-211.

Laurillard, D. (1993). *Rethinking university teaching: A framework for the effective use of educational technology*. London: Routledge.

BEST COPY AVAILABLE

Lee, S. H., & Boling, E. (1999, May-June). Screen design guidelines for motivation in interactive multimedia instruction: A survey and framework for designers. *Educational Technology*, 19-26.

Mayer, R. E., & Sims, V. K. (1994). For whom is a picture worth a thousand words? Extensions of a dual-coding theory of multimedia learning. *Journal of Educational Psychology, 86*(3), 389-401.

McNeil, S., & Varagoor, G. (1999). Cooperation, collaboration and communication in educational multimedia design and development teams. In B. Collis and R. Oliver (Eds.), *Proceedings of the 1999 Conference on Educational Multimedia and Hypermedia*. Charlottesville, VA: Association for the Advancement of Computing in Education.

Niemeyer, C. (1997). Authorware for computer-assisted instruction. *Library Hi Tech, 15*(1-2), 133-144.

Oz, E., & White, L. D. (1993). Multimedia for better training. *Journal of Systematic Management, 44*(5), 34-43.

Perry, P. (1994). *Multimedia: Developer's guide*. Indianapolis, IN: Sams Publishing.

Phillips, R. (1997). *The developer's handbook to interactive multimedia: A practical guide for educational applications*. London: Kogan Page.

Rieber, L. P. (1996). Seriously considering play: Designing interactive learning environments based on the blending of microworlds, simulations, and games. *Educational Technology Research & Development, 44*(2), 43-58.

Rieber, L. P. (1997). Authorware board game [Computer software]. Athens, GA: University of Georgia.

Seels, B., & Glasgow, Z. (1997). *Making instructional design decisions*. Upper Saddle River, NJ: Prentice-Hall.

Seiler, J. R., Peterson, J. A., Taylor, C. D., & Feret, P. P. (1997). A computer-based multimedia instruction program for woody plant identification. *Journal of Natural Resources and Life Science Education, 26*(2), 129-131.

Small, R. V., & Ferreira, S. M. (1994). Multimedia technology and the changing nature of research in the school library. *The Reference Librarian, 44*, 95-106.

Snydar, S. (1998, Spring). Training over the intranet - A Shockwave case study. *Journal of Interactive Instruction Development*, 12-17.

Soloway, E. (1994). Ways of seeing. *Communication, 37*(2), 15-21.

Yaverbaum, G. J., & Nadarajan, U. (1995). Learning basic concepts of telecommunications: An experiment in multimedia and learning. *Computers in Education, 26*(4), 215-224.

Acknowledgements

We particularly thank our colleague Ann Jenkins for her tireless work on the project throughout the entire design and development process. We thank Donna Smith and Cathy Matuszak for their work on the interface and other graphical elements. Gary Kidney recorded the audio components. Lloyd Schuh contributed some graphics. Joe Lynch and Vanessa Burford contributed to the initial design of the project.